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Bridge & Structures Office Accelerated Bridge Construction



**Washington State
Department of Transportation**

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Every Day Counts

Population growth and demand for infrastructure is exceeding our ability to construct new infrastructure without significant impact to nearby economies. In order to enhance mobility and speed up bridge construction, the Federal Highway Administration (FHWA) has been actively promoting the advantages of Accelerated Bridge Construction (ABC) through the Every Day Counts (EDC) Initiative. This initiative put a term to many things WSDOT has been doing all along.

Since the EDC Initiative was put in place, WSDOT has been more actively been promoting ABC methods. These methods have minimized traffic disruption, improved work zone safety and reduced on-site environmental impacts.

ABC aims to more fully utilize existing technology in new ways to speed up bridge construction, and develop new technology. Some of these technologies include precast concrete members, prefabricating larger portions of bridges off site, and installing them in larger sections with larger cranes or Self-Propelled Modular Transporters (SPMT). ABC can minimize traffic disruptions by moving construction activities traditionally done on site, off site. And it can allow many portions of a bridge to be constructed concurrently with other activities that may not have otherwise been done at the same time.

ABC includes creative contracting methods, and providing financial incentives for contractors to minimize total traffic disruption times. WSDOT and the ECD Initiative also have an expressed desire to protect the environment through the ABC methods selected. By speeding up on site bridge construction, more work can be done in narrower fish and wildlife windows, and fewer construction activities will be required in environmentally sensitive areas.

Starting in 2008, WSDOT initiated a plan for development and implementation for ABC. Under the direction of the State Bridge Engineer, WSDOT established a task force that is headed by an ABC Advisory Committee. The committee develops standards, guidelines, and key policies for implementing structure design for ABC.

Consisting of subject matter experts from the Bridge Design Office, Bridge Construction Office, WSDOT

Region Offices, FHWA, engineering consultants, academia & research, precast producers, maintenance, materials, and other relevant fields, the task force outlined a strategic plan. The plan develops, implements, and promotes ABC practice in Washington State.

In recent years, WSDOT has conducted research and constructed many projects using those prefabricated substructures. WSDOT has also constructed many bridges entirely off-line and slid entire superstructures in place during brief, single weekend road closures.



INNOVATIVE PRACTICE

Rigorous ABC Assessment

ABC reduces traffic delays and hazards, it provides infrastructure improvements at a fast pace, and it yields benefits to the traveling public and the regional economy. However since ABC increases construction costs by 30-100%, WSDOT rigorously evaluates projects. Project and traffic impact assessments, ABC Impact Quantification Proposals, ABC Cost Benefit Developments, ABC Selection Criteria and Schedule are tools for the innovative practice.

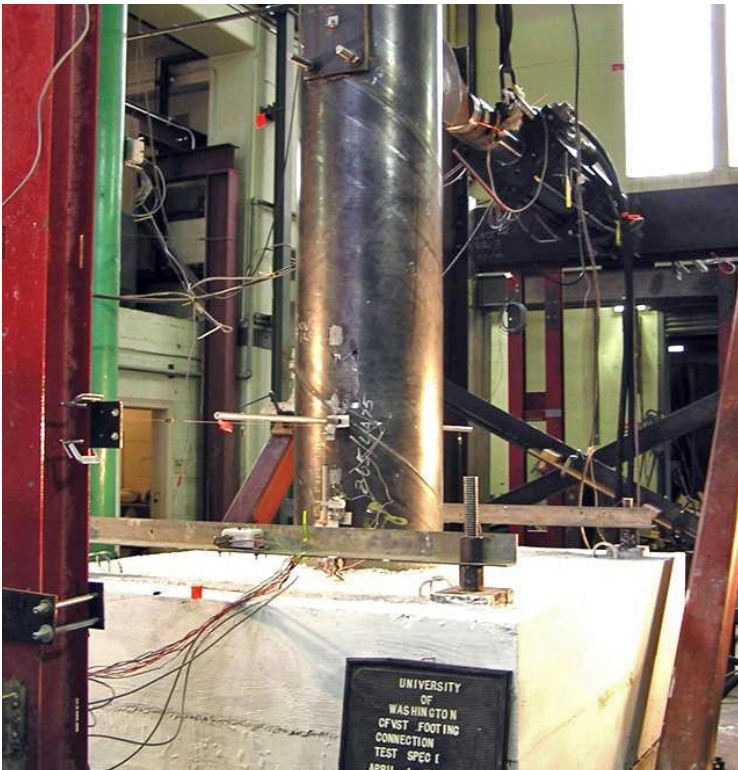
With ABC, secondary costs on the local economy are carefully considered. During the time traffic is disrupted, costs such as a contractor's lane rental rate, time spent with people and goods stuck in traffic, and detour travel time can have a serious impact to the local economies. Considering these costs significantly reduces the total project cost. And the savings of the secondary costs can quickly overcome the increase in direct construction costs.



Industry Engagement And Academic Technical Research

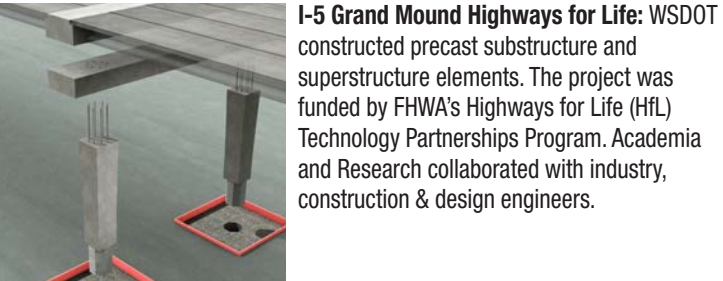
WSDOT works with the National Council of Highway Research Programs (NCHRP) to provide funding for academic research. Intensive national and international research is ongoing in these areas:

- Seismic column-superstructure connections
- Seismic response of segmental girder systems
- Segmental post-tensioned columns
- Column-to-foundation connections
- Post-earthquake accelerated column repair & replacement
- Self centering columns
- Concrete filled tubes
- Rapid constructible connections
- Innovative materials
- Component maintenance



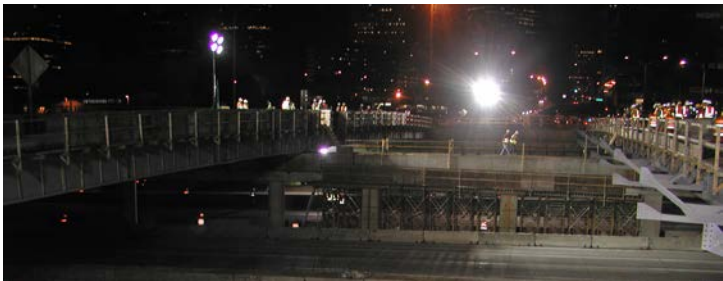
WSDOT ABC PROJECTS

I-5 Skagit River Bridge: WSDOT coordinated with the National Transportation Safety Board (NTSB) to demolish and rebuild a collapsed span. A temporary span was built in only 25 days.



I-5 Grand Mound Highways for Life: WSDOT constructed precast substructure and superstructure elements. The project was funded by FHWA's Highways for Life (HfL) Technology Partnerships Program. Academia and Research collaborated with industry, construction & design engineers.

I-405 Bellevue NE 8th Avenue: WSDOT slid a completed superstructure onto an existing substructure. Funded by Sound Transit, City of Bellevue, FHWA, WSDOT and TIB.



I-90 Easton: WSDOT removed a damaged superstructure in 24 hours, restoring Interstate commerce. Emergency span replacement in six weeks.



SR 167 Puyallup River Bridge: WSDOT removed and replaced a circa 1925 steel truss bridge rapidly. The truss was slid from its original piers to ones at a new location.

SR 30 Lewiston and Clark: WSDOT replaced superstructure roadway deck and structural elements with rapid construction techniques.



SR 16 Nalley Valley: WSDOT build precast concrete crossbeams and lifted them into place.

SR 104 Hood Canal East and West: WSDOT replaced approach spans with sliding techniques. The bridge is the longest floating bridge in salt water in the world.



SR 104 Hood Canal Transition Span: WSDOT constructed a unique tubular design steel truss, prefabricated off site as a whole. It was the first tubular truss constructed in the US that did not rely upon gusset plate connections. It was slid into place utilizing rapid construction.



SR 202 / SR 520 Precast Pier Cap: WSDOT installed a precast pier cap using the grouted duct technology.